



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/659,230	09/10/2003	Tom Weidner	P03,0361	3480
26574	7590	07/19/2006	EXAMINER	
SCHIFF HARDIN, LLP PATENT DEPARTMENT 6600 SEARS TOWER CHICAGO, IL 60606-6473			SWERDLOW, DANIEL	
			ART UNIT	PAPER NUMBER
			2615	

DATE MAILED: 07/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/659,230	<b>Applicant(s)</b> WEIDNER, TOM	
	<b>Examiner</b> Daniel Swerdlow	<b>Art Unit</b> 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 April 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-69 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1, 10 through 12, 14 through 36, 45 through 47 and 49 through 69 are rejected under 35 U.S.C. 102(e) as being anticipated by Kates (US Patent 6,831,986).**

3. Regarding Claim 1, Kates '986 discloses a feedback cancellation (i.e., a feedback compensator) for use in a hearing aid (i.e., an acoustic amplification system) (Fig. 4) comprising: an adaptive filter 401 that corresponds to the adaptive feedback compensation filter claimed, is supplied as an input with the amplified output signal 425 and generates a compensation signal  $v(n)$  from the amplified output signal 425, the compensation signal  $v(n)$  being combined with the input signal  $s(n)$  in summing junction 409; and a filter 419, that corresponds to the frequency limiting filter claimed and is connected relative to the adaptive filter 401 that corresponds to the adaptive feedback compensation filter claimed, limits the frequency range within which the compensation filter compensates feedback by frequency limiting the input to the adaptive filter 401 that corresponds to the adaptive feedback compensation from the amplified output signal 425 (column 8, lines 12-16) and is adaptable during compensation (column 8, lines 16-18).

Art Unit: 2615

4. Regarding Claim 10, Kates '986 further discloses adapting the frequency select (i.e., frequency limiting) filters 421, 423 by analyzing an error signal (Fig. 5, step 507) that corresponds to the feedback compensated input signal claimed according to a sequence that inherently requires an analysis unit (Fig. 5; column 8, lines 52-54).
5. Regarding Claim 11, Kates '986 further discloses adapting the frequency select (i.e., frequency limiting) filters 421, 423 by analyzing an error signal (Fig. 5, step 507) that corresponds to the filter parameter claimed (Fig. 5; column 8, lines 52-54).
6. Regarding Claim 12, Kates '986 further discloses cross correlating (i.e., comparing) filtered output signal  $f(n)$  and filtered input signal  $g(n)$  to determine adaptive filter updating (Fig. 5, steps 509, 511; column 9, lines 7-11).
7. Regarding Claim 14, Kates '986 further discloses an acoustic feedback path (Fig. 4, reference 417; column 8, lines 1-2).
8. Regarding Claim 15, while Kates '986 is silent as to the susceptibility of the input signal to electromagnetic feedback, the mere existence of such a susceptibility of the input signal is not limiting on the structure of the feedback compensator absent any recitation in the claim that the feedback compensator acts on the electromagnetic feedback. As such, Claim 15 is rejected on the same grounds as Claim 1.
9. Regarding Claim 16, Kates '986 further discloses an LMS adaptation unit (Fig. 4, reference 403; column 8, lines 35-38) that corresponds to the adaptation unit claimed dependent on a filtered error signal  $g(n)$  and filtered feedback path signal  $f(n)$  (i.e., a signal within the acoustic amplification system).

10. Regarding Claims 17 and 18, Kates '986 further discloses an LMS adaptation unit (Fig. 4, reference 403; column 8, lines 35-38) that corresponds to the adaptation unit claimed dependent on a filtered error signal  $g(n)$ .
11. Regarding Claim 19, Kates '986 further discloses adapting the filter 421 that produces the filtered error signal  $g(n)$  (Fig. 5, step 503; column 8, lines 56-59).
12. Regarding Claim 20, Kates '986 further discloses adapting the frequency select (i.e., frequency limiting) filters 421, 423 according to a sequence that inherently requires a controller (Fig. 5; column 8, lines 52-54).
13. Regarding Claim 21, Kates '986 further discloses selection of individual bandpass filters by adjustment of cascaded individual notch filters (Fig. 8, reference 801, 803, 805, 807; column 10, lines 40-45) that correspond to the changeover switch claimed.
14. Regarding Claim 22, Kates '986 further discloses the adaptive frequency select (i.e., frequency limiting) filters 421, 423 having coefficients adapted to modify the filter function (column 8, lines 59-65).
15. Regarding Claim 23, Kates '986 further discloses the LMS adaptation unit (Fig. 4, reference 403; column 8, lines 35-38) that corresponds to the adaptation unit claimed receives output  $f(n)$  of the frequency select (i.e., frequency limiting) filter 423.
16. Regarding Claim 24, Kates '986 further discloses the LMS adaptation unit (Fig. 4, reference 403; column 8, lines 35-38) that corresponds to the adaptation unit claimed receives output  $g(n)$  of the frequency select (i.e., further frequency limiting) filter 421.

17. Regarding Claim 25, Kates '986 further discloses the adaptive frequency select (i.e., frequency limiting) filters 421, 423 having coefficients adapted to modify the filter function (column 8, lines 59-65).
18. Regarding Claim 26, Kates '986 further discloses adapting the frequency select (i.e., frequency limiting) filters 421, 423 according to a sequence that inherently requires a controller (Fig. 5; column 8, lines 52-54).
19. Regarding Claim 27, Kates '986 further discloses selection of individual bandpass filters by adjustment of cascaded individual notch filters (Fig. 8, reference 801, 803, 805, 807; column 10, lines 40-45) that correspond to the changeover switch claimed.
20. Regarding Claim 28, Kates '986 further discloses the adaptive frequency select (i.e., frequency limiting) filters 421, 423 having coefficients adapted to modify the filter function (column 8, lines 59-65).
21. Regarding Claim 29, Kates '986 further discloses a so-called frozen filter 419 that corresponds to the first frequency-limiting filter claimed and wherein the LMS adaptation unit 403 that corresponds to the adaptation unit claimed receives the input signal  $e(n)$  through a frequency select filter 421 that corresponds to the second frequency-limiting filter claimed and receives the output of the so-called frozen filter 419 that corresponds to the first frequency-limiting filter claimed through a frequency select filter 423 that corresponds to the third frequency-limiting filter claimed. Kates '986 teaches adaptation of the so-called frozen filter 419 at column 8, lines 16-29.
22. Regarding Claim 30, Kates '986 further discloses coefficients are copied from the frequency select filter 421 that corresponds to the second frequency-limiting filter claimed to the

Art Unit: 2615

frequency select filter 423 that corresponds to the third frequency-limiting filter claimed (Fig. 5, step 505; column 8, lines 62-65).

23. Regarding Claim 31, Kates '986 further discloses the adaptive frequency select filters 421, 423 that correspond to the second and third frequency-limiting filters claimed having coefficients adapted to modify the filter function (column 8, lines 59-65).

24. Regarding Claim 32, Kates '986 further discloses adapting the frequency select filters 421, 423 that correspond to the second and third frequency-limiting filters claimed by analyzing an error signal (Fig. 5, step 507) that corresponds to the feedback compensated input signal claimed according to a sequence that inherently requires an analysis unit (Fig. 5; column 8, lines 52-54).

25. Regarding Claim 33, Kates '986 further discloses selection of individual bandpass filters by adjustment of cascaded individual notch filters (Fig. 8, reference 801, 803, 805, 807; column 10, lines 40-45) that correspond to the changeover switch claimed.

26. Regarding Claim 34, Kates '986 further discloses the adaptive frequency select (i.e., frequency limiting) filters 421, 423 having coefficients adapted to modify the filter function (column 8, lines 59-65).

27. Regarding Claim 35, Kates '986 discloses a hearing aid (Fig. 4) comprising: a microphone 407 that corresponds to the input transducer claimed and produces an input signal  $s(n)$  from an incoming acoustic signal  $x(n)$ ; a hearing aid processing unit 411 that corresponds to the hearing aid signal processor claimed and produces an amplified output signal 425, the input signal being influenced by a feedback via a feedback path 417; an adaptive filter 401 that corresponds to the adaptive feedback compensation filter claimed and generates a compensation

signal  $v(n)$  that is combined with input signal  $s(n)$  in summer 409; a so-called frozen filter 419 that corresponds to the frequency-limiting filter claimed, limits the frequency range within which the compensation filter compensates feedback (column 3, lines 30-34) and is adaptable during compensation (column 8, lines 16-29).

28. Claims 1, 45 through 47 and 49 through 69 are essentially similar to Claims 1, 10 through 12 and 14 through 34, respectively, and are rejected on the same grounds.

29. Regarding Claim 50, while Kates '986 is silent as to the susceptibility of the input signal to electromagnetic feedback, the mere existence of such a susceptibility of the input signal is not limiting on the method of feedback compensation absent any recitation in the claim that the feedback compensation acts on the electromagnetic feedback. As such, Claim 50 is rejected on the same grounds as Claim 36.

30. **Claims 1 through 9, and 36 through 44 are rejected under 35 U.S.C. 102(b) as being anticipated by Kates (US Patent 6,072,884).**

31. Regarding Claim 1, Kates '884 discloses a feedback cancellation (i.e., a feedback compensator) for use in a hearing aid (i.e., an acoustic amplification system) (Fig. 1) comprising: an adaptive filter 118 that corresponds to the adaptive feedback compensation filter claimed, is supplied as an input with the amplified output signal 108 and generates a compensation signal 120 from the amplified output signal 108, the compensation signal 120 being combined with the input signal 100 in summing junction 102; and a filter 114, that corresponds to the frequency limiting filter claimed and is connected relative to the adaptive filter 118 that corresponds to the adaptive feedback compensation filter claimed, limits the frequency range within which the



Art Unit: 2615

compensation filter compensates feedback by frequency limiting the input to the adaptive filter 118 that corresponds to the adaptive feedback compensation from the amplified output signal 108 (column 8, lines 51-55) and is adaptable during compensation (column 7, lines 35-38).

32. Regarding Claim 2, Kates '884 further discloses the filter 114, that corresponds to the frequency limiting filter claimed being an IIR filter (column 4, lines 8-9). Because an IIR filter comprises a tapped delay line, each tap of which is weighted and summed with the other weighted taps, it inherently comprises of a plurality of individual filters that in combination form its filter function.

33. Regarding Claim 3, as stated above apropos of Claim 2, the individual weighted taps of the IIR filter have respectively different functions and are selectable by the weighting coefficients.

34. Regarding Claim 4, Kates '884 further discloses the filter 114, that corresponds to the frequency limiting filter claimed modeling resonant aspects of the feedback path (i.e., cover the feedback frequency range) (column 8, lines 51-55).

35. Regarding Claim 5, Kates '884 further discloses the filter 114, that corresponds to the frequency limiting filter claimed being an IIR filter (i.e., having coefficients) and being changed (i.e., adapted to modify the filter function) (column 7, lines 35-38).

36. Regarding Claim 6, Kates '884 further discloses the amplified output signal 108 supplied to the LMS adapter 122 of the adaptive filter 118 that corresponds to the adaptive feedback compensation filter claimed through the filter 114, that corresponds to the frequency limiting filter claimed.

Art Unit: 2615

37. Regarding Claim 7, Kates '884 further discloses the filter 114, that corresponds to the frequency limiting filter claimed being an IIR filter (i.e., having coefficients) and being changed (i.e., adapted to modify the filter function) (column 7, lines 35-38), which inherently requires a controller.

38. Regarding Claim 8, Kates '884 further discloses the filter 114, that corresponds to the frequency limiting filter claimed being an IIR filter (column 4, lines 8-9). Because an IIR filter comprises a tapped delay line, each tap of which is weighted and summed with the other weighted taps, it inherently comprises of a plurality of individual filters that in combination form its filter function with the individual weighting coefficients corresponding to the changeover switch claimed.

39. Regarding Claim 9, Kates '884 further discloses the filter 114, that corresponds to the frequency limiting filter claimed being an IIR filter (column 4, lines 8-9), inherently having coefficients adapted to modify the filter function.

40. Claims 36 through 44 are essentially similar to Claims 1 through 9, respectively, and are rejected on the same grounds.

### ***Claim Rejections - 35 USC § 103***

41. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2615

42. **Claims 13 and 48 rejected under 35 U.S.C. 103(a) as being unpatentable over Kates '986 in view of Weidner (US Patent 6,404,895).**

43. Regarding Claims 13 and 48, as shown above apropos of the respective parent claims, Kates '986 anticipates all elements except performing feedback analysis by measuring feedback with an oscillation detector. Weidner discloses use of an oscillation detector to detect feedback in a hearing aid (column 2, lines 62-67). Weidner further discloses that such an arrangement is especially useful where the feedback frequency is to be determined. It would have been obvious to one skilled in the art at the time of the invention to apply measuring feedback with an oscillation detector as taught by Weidner to the feedback compensation taught by Kates '986 for the purpose of realizing the aforesaid advantage.

#### ***Response to Arguments***

44. Applicant's arguments filed 26 April 2006 have been fully considered but they are not persuasive.

45. Applicant alleges that Kates '986 fails to disclose teach a frequency-limiting filter as claimed in Claims 1, 35 and 36. Examiner respectfully disagrees. The so-called "frozen filter" 419 disclosed in Kates '986 is structurally disposed as claimed and is disclosed as being changeable during operation (column 8, lines 16-18). Examiner notes that, in spite of the wording of applicant's argument, the claims are not limited to an adaptive filter, but merely require that the filter be "adaptable". As shown In the prior art rejections above, Kates '884 similarly meets this claim limitation and further teaches the properties of the filter as claimed in the dependent claims as narrowed by applicant's amendment.

***Conclusion***

46. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Swerdlow whose telephone number is 571-272-7531. The examiner can normally be reached on Monday through Friday between 7:30 AM and 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh H. Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2615

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Daniel Swerdlow  
Primary Examiner  
Art Unit 2615

ds  
10 July 2006